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SKÅNE FROM AN ALTITUDE OF 900 KILOMETERS

H. Svensson

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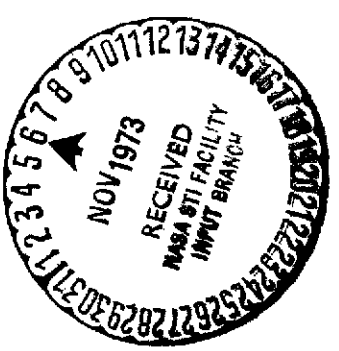

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During the last ten years modern satellite and rocket technology has made it possible to view the earth from very high altitudes. However, the first satellite with the direct task of giving information about the surface of the earth itself is sent up first in 1972. The experiment, which is American, goes under the designation ERTS (Earth Resources Technology Satellite). /137*

ERTS-1 is an unmanned satellite. The observation altitude is a little more than 900 km and the circulation period for the almost polar trajectory is 103 min. Collected data are transmitted to ground by telemetry. Signals in the opposite direction activate and control the functions of satellites.

For the purpose of obtaining detailed and reliable information in the form of pictures of the earth's surface from various points of view, the multi-spectral photographic technique is used in ERTS-1. Briefly described the background is that since various objects for material properties have their most pronounced spectral properties in different frequency bands, a greater degree of differentiation (in contrast) can be obtained within the area of the picture by taking pictures of an object simultaneously in several spectral intervals. /138

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* Numbers in the margin indicate pagination in the foreign text.

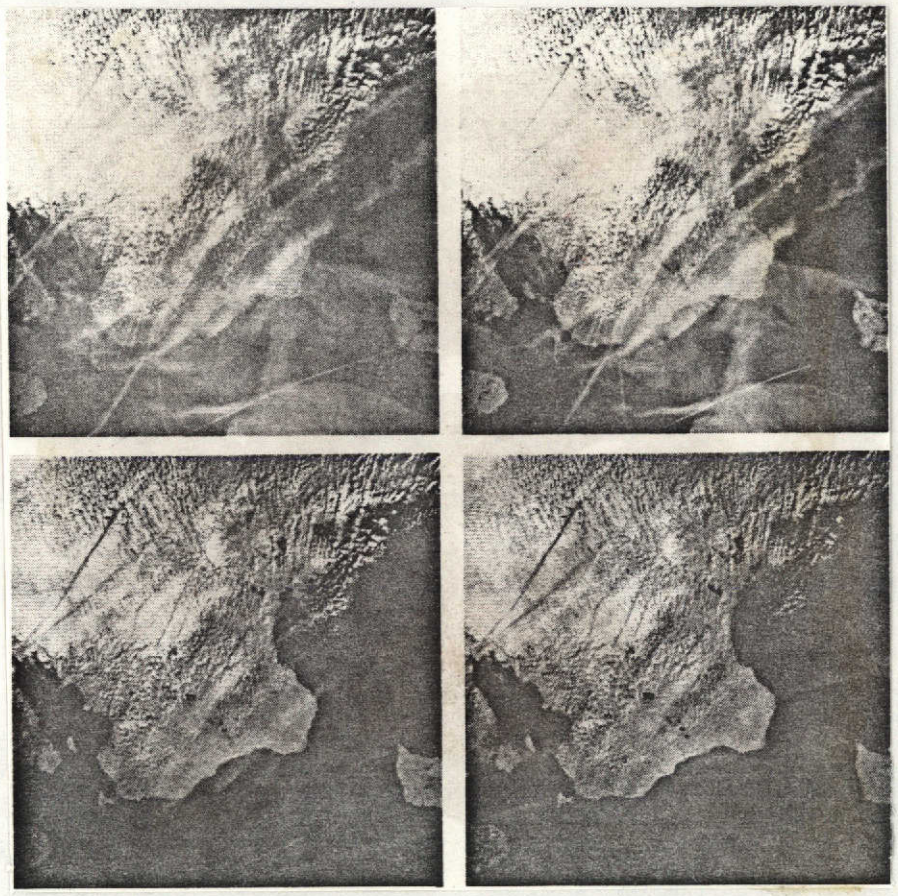

Fig. 1. ERTS-1 picture of Skåne 7 October 1972. Approximate scale 1:3,000,000. The series of pictures are contact copies of the negatives from the four channels of the multi-spectral scanner: upper row 0.5-0.6 µm and 0.6-0.7 µm, lower row 0.7-0.8 µm and 0.8-1.1 µm. Negatives from NASA.

The series of pictures, fig. 1, is an assembly of contact copies from negatives from the four channels of the multi-spectral sensor in the ERTS-1, from a band (0.5-0.6 μm) in the middle of the visible spectrum to an interval (0.8-1.1 μm) in the so-called near infrared spectral range (lower right).

/139

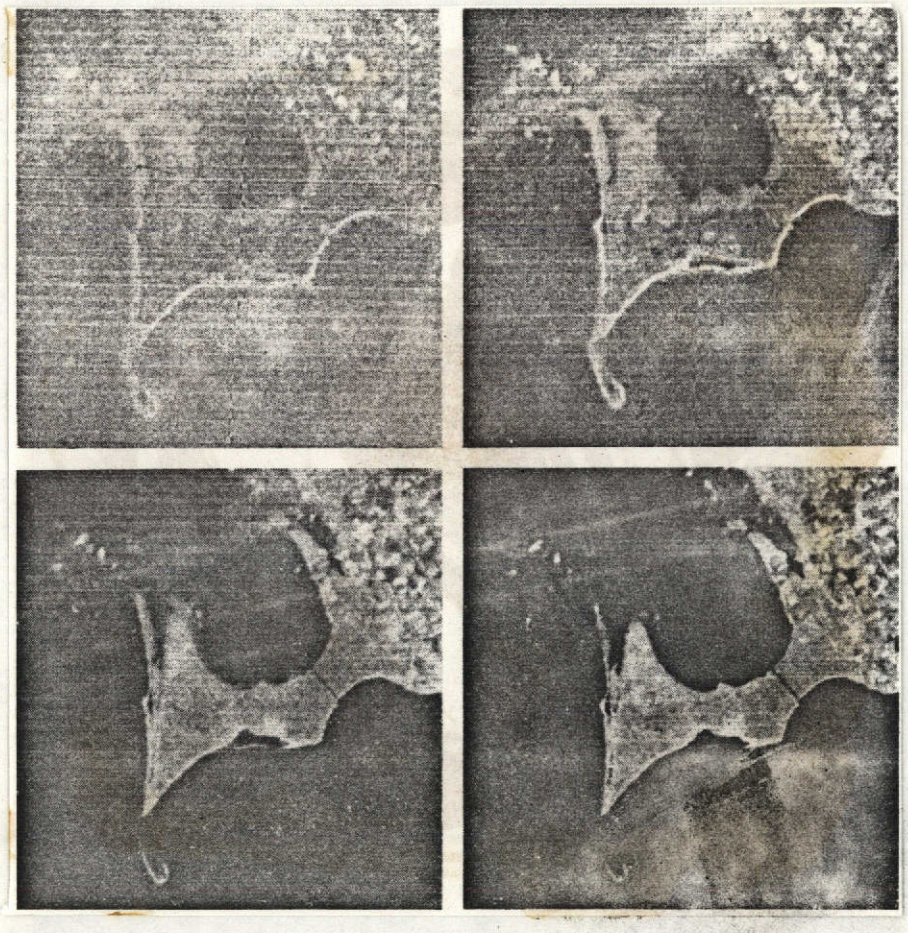

Fig.2. The Falsterbo peninsula pictured in four frequency ranges (the same as in fig. 1). Approximate scale 1:300,000. The pictures are magnifications from parts of the negatives in figure 1. Negatives from NASA.

During the passage on October 7 a large part of Skåne was covered by clouds and haze. The series of pictures gives some idea about to what extent pictorial data can be obtained in a certain situation and what range of wavelengths then gives the best reproduction, e.g., for a coastline.

The series of pictures in figure 2 are magnifications of parts of the same negative which was used for figure 1. It testifies to the high quality of the material and can also give information on the advantages of multi-spectral techniques in photographing various landscapes or surface objects. For instance, beach formations, lagoons, and beach spurs (Mäklappen) appear most clearly in the two channels in the visible spectral range. The ground- (vegetation-) surface can be differentiated /140 best in the IR channels, where the Falsterbo canal also is clearest.

ERTS-1 will be followed in 1973 by ERTS-B. The American project Skylab moved up from 1972 will also be put into operation in 1973, but this will not affect our latitude. In contrast to ERTS, Skylab is a manned space project. In addition to a series of technical-scientific and medical experiments to be performed on board Skylab, so-called Earth Resources Experiments are also included, e.g., with a multi-spectral scanner for data collection. According to information obtained this scanner will have no less than 13 channels (from 0.4-12.5 μm). There will be an unusual amount of data on the earth surface which will be translated back to ground during the next coming years via the data collection system of the satellites.

Abstract

ERTS-1, an unmanned observation satellite at an altitude of 900 km, takes pictures of the earth's surface in several frequency bands and relays them to ground by telemetry. Coastal formations are seen to be clearest in the visible spectral ranges, whereas ground cover is differentiated best in the IR channels. In 1973 Skylab will also perform Earth Resources Experiments, but it will not affect Sweden's latitude.